

Urban design with soundscape - Experiences of a Korean-German team

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ABSTRACT

A kick off Soundscape workshop in Seoul for collaboration of a Korean and German team research took place at the time while the International Organization for Standardization "ISOTC43, SC1,SC2" met in Seoul and brought together national and international experts working on the standard for Soundscape evaluation procedures in Working Group ISOTC43SC1/WG54. Both organizers of the workshop are members of the WG 54, so for the workshop it was possible to bring together national and international experts in an evaluation process that looks for urban spaces and their design with respect to people's mind but also to using recording facilities like a binaural recording system and video cameras. Beside theoretical and practical presentations and discussions as a highlight was set a 2 hours Soundwalk in Seoul, evaluating different urban spaces using explicitly Soundscape evaluation procedures. The workshop was setting a new mile stone in Soundscape research and collaboration of Soundscape research in different parts of the world. The meaning of sound, the perception of noise, the trend to design urban spaces not only with architectural know how but also with user's expertise were central in the evaluation and brought new insights for both parties.

KOREAN-GERMAN COLLABORATION

The main objective of this collaboration was to experience the soundscape research on an international basis and to go with this project beyond the current state-of-the-art, through coordinated international and interdisciplinary efforts like it was done already in collaboration of scientist within the Acoustical Society of America related to different workshops on Soundscapes. Moreover, it will be connected to the COST Action TD 0804 [1] and the ISOTC43SC1/WG54. In the context of the COST Action TD 0804 the soundscape research is understood as a timely paradigm shift in that it considers environmental screening as an evaluation by the local experts that are people that will deal with the knowledge of an area due to their experiences with living at these places.

The concepts of soundscape were theoretically introduced with all its aspects that make it an interdisciplinary field of science. The general aspects of theory and practical use of measurement technology were presented as well as the methods of final evaluation. Moreover, preparations were made for the planned soundwalks, which should be carried out in and around Seoul city. The participants were familiarized with the locations, measurement equipment and evaluation sheets.

Around 50 participants from more than 10 countries joined the Korea-Germany workshop on Soundscape and Sound walking. In detail, the Workshop contained on training on theoretical and practical implications of Soundscape presented by international and Korean speakers focusing on Soundscape and Landscape, Psychoacoustics, Case studies,

Measurements and Calculation as well as evaluation with Local Experts. [3-11]. It was followed by a sound walk with 15 local and international participants.

THE CONCEPT FOR THE SOUNDWALK: GERMAN PART

As the walk and also the points to listen to the sounds and watching the area have been proposed by the Korean team that did know the area, the German team provided here the typical Soundwalk procedure introduced in the workshop as to learn how to handle the listening situation, how to use the rating scales, and how to provide the elaborated expertise to the interviewer. For elaborated information on this procedure see the paper by Fiebig et al "Education in Soundscapes. A Seminar with young scientist in short term scientific mission. Soundscape, measurement and evaluation", ICA Sydney 2010. [2]



Figure 1. Example: Soundwalk in Berlin, Mainstation Zoo

As technical devices a binaural recording system (fig. 2) was introduced to the participants for evaluation.



Figure 2. Binaural recording systems: Left: Artificial head, right: Binaural headset

Instructions were given how to proceed at listening places:

- Define places (at there the direction to look at)
- Mental record of the time (approx. 40s) within "Start"- and "Stop"-period
- Rate on scales and usage of the evaluation sheet for expressing the situation in own words
- Go on to the next place

Rating scales given to the Sound walkers:

Korea-Germany Workshop

Soundwalk Seoul, 19th November 2009

Location _____ My initials _____

How loud is it here?

|-----|-----|-----|-----|

not slightly fairly quite very

How loud is it here?

|-----|-----|-----|-----|

extremely very moderately slightly not at all

How unpleasant is it here?

|-----|-----|-----|-----|

not slightly fairly quite very

How unpleasant is it here?

|-----|-----|-----|-----|

extremely very moderately slightly not at all

Going through my mind ...

Figure 3. Rating scales: Rohrmann and ICBEN

SOUNDWALK SEOUL - DESCRIPTION AND RESULTS

The Soundwalk was planned for 6 stations, but due to the visit of the American president the same day, different areas in Seoul were closed for the public, so that 4 areas (positions 1, 2, 5, and 6) remained for research (fig. 4).

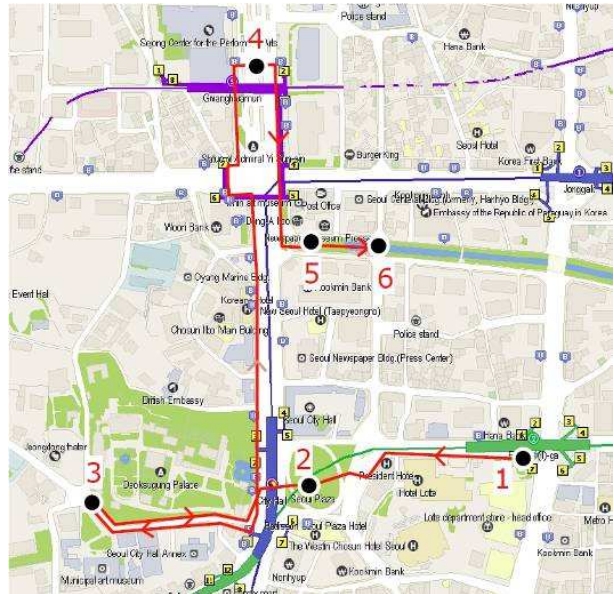


Figure 4. Overview of listening positions

Position 1 is a shopping street with heavy traffic and high-rise buildings are close to road traffic. Position 2, located in downtown Seoul, is an urban square with fountains. Position 5 is exposed to small road traffic and surrounded by buildings. Position 6 is a pedestrian pathway with the city stream, Cheong Gye Cheon.

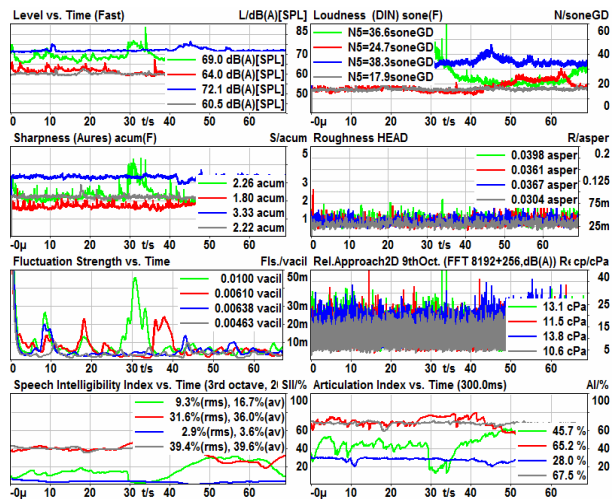


Figure 5. Analysis overview of four selected places (only small selected time sequences): Green: place 1, red: place 2, blue: place 5; grey: place 6

Position 1: Department store

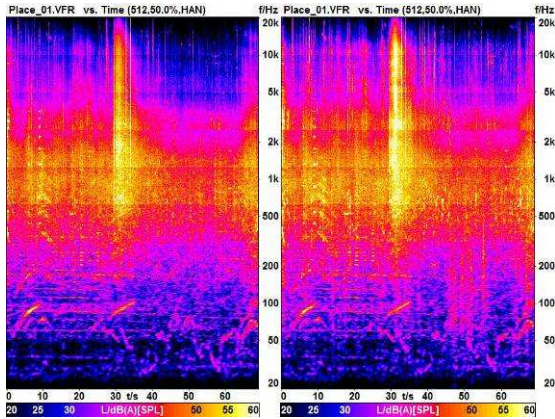


Figure 6. Binaural recordings; VFR vs. time



Figure 7. Sound walkers in judgement procedure

Position 2: Seoul square

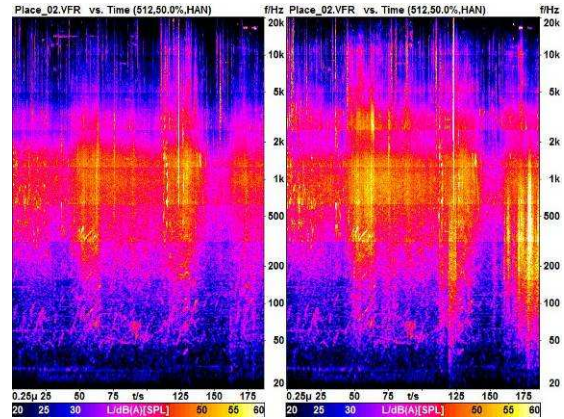


Figure 9. Binaural recordings; VFR vs. time



Figure 10. Picture of the Seoul square

Korea-Germany Workshop on Soundscape

Soundwalk Seoul, 19th November 2009

Location: Department Store

How loud is it here?

not | slightly | fairly | quite | very

How loud is it here?

extremely | very | moderately | slightly | not at all

How unpleasant is it here?

not | slightly | fairly | quite | very

How unpleasant is it here?

extremely | very | moderately | slightly | not at all

- Occasional traffic (not annoying but some close bus & taxi-stop leave annoys
- Crowded, too much traffic noise, noisy, heavy traffic, too loud
- Windy cold, where does the airplane come from?, helicopter, busses, people walking, surprising not so much noise
- Typical main road, not very difficult to judge; hope everyone understand the procedure
- Seoul traffic is more silent than expected, Less traffic than expected, quite deconstructed place

Figure 8. Ratings scale results with comments by Sound walkers

Korea-Germany Workshop on Soundscape

Soundwalk Seoul, 19th November 2009

Location: Seoul Square

How loud is it here?

not | slightly | fairly | quite | very

How loud is it here?

extremely | very | moderately | slightly | not at all

How unpleasant is it here?

not | slightly | fairly | quite | very

How unpleasant is it here?

extremely | very | moderately | slightly | not at all

- Traffic light close, only disturbing on blue light
- Natural features save needed, not special
- Loud goes up and down, it's better in the sun
- When car is moving and stop the feeling is quite different
- Peace and noise mixed, Open space, place looks cold
- Many artifacts „Backward noise“, it is cold hear, many sounds, but not really loud
- The open space at the plaza makes the space more agreeable than the streets which are narrow
- Still cold, don't want to spend too much time here, but sun is there so that's ok even ..
- To opened, I mean vacant, Idling noise from the road traffic is quite annoying, airplane pollution also seems serious
- Traffic light changes are too short for a traffic-wave, much more quieter than expected, because of the visit of the American president

Figure 11. Ratings scale results with comments by Sound walkers

Position 5: Cheon Gye Square

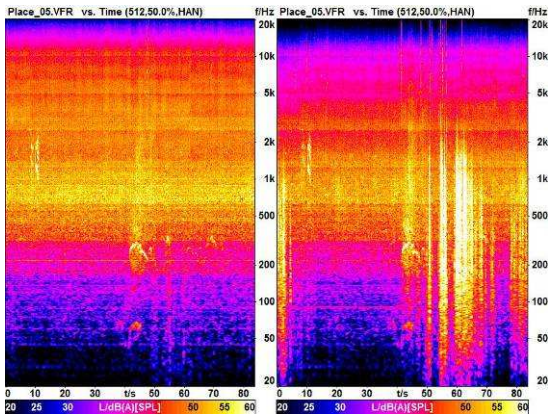


Figure 12. Binaural recordings; VFR vs. time



Figure 14. Picture of Cheon Gye Square

Korea-Germany Workshop

Soundwalk Seoul, 19th November 2009

Location: Cheon Gye Square

How loud is it here?

How loud is it here?

How unpleasant is it here?

How unpleasant is it here?

- Machinery sound is too loud, natural features are not enough, windy, too dark
- Colder without the sun, wind influences the soundscape
- Idling busses, PA from restaurant-Waterfall makes background sound, not so many people in this time. I think weekend or holiday there will be many people at the place.-Wind, water, chilly winds
- It is too cold and the motor sounds mask the water...
- The waterfall is not a particularly pleasant sound although it may mask some of the traffic
- Waterfall is very loud compared to traffic noise only busses can be heard. The wind makes some noise.
- The sound of flowing water, but traffic road noise is masking.
- Good, because of water sounds, various kinds of water sounds, windy, reverberation because of lateral buildings. Still road traffic is heavy and annoying.
- Motor sounds, the volume of the water sounds are not loud enough for masking

Figure 13. Ratings scale results with comments by Sound walkers

Position 6: Cheong Gye Cheon

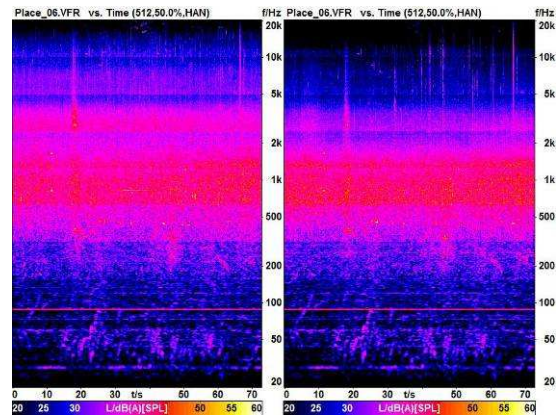


Figure 15. Binaural recordings; VFR vs. time



Figure 16. Picture of Cheong Gye Cheon (Sound walkers in judgement procedure)

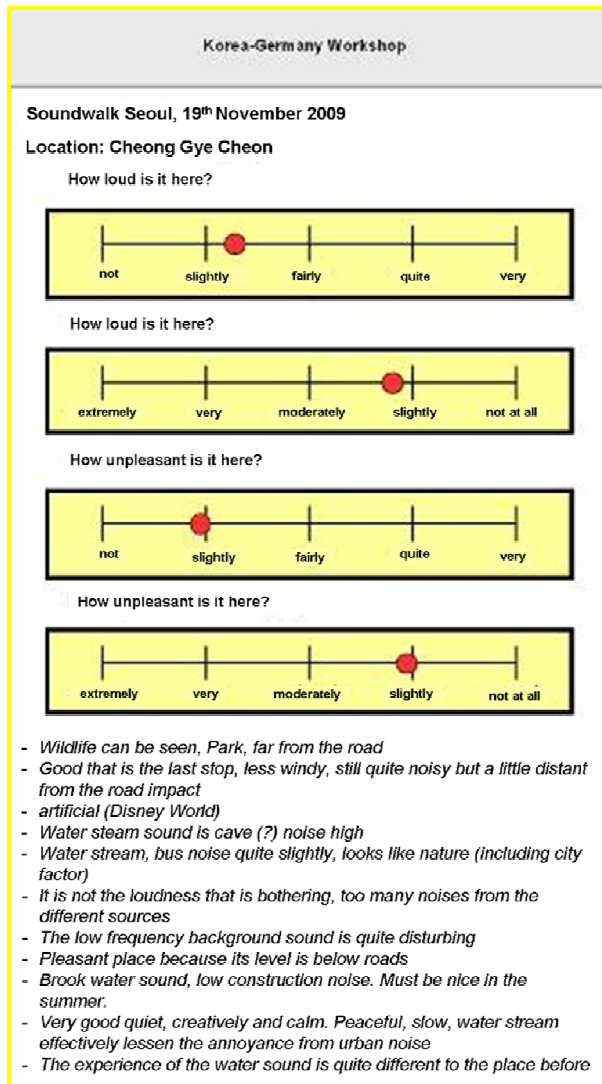


Figure 17. Ratings scale results with comments by Sound walkers

THE CONCEPT FOR THE SOUNDWALK: KOREAN PART

Fifteen subjects, comprised of seven domestic and eight foreign experts in the Soundscape studies, evaluated four urban Soundscapes through a questionnaire survey. The questionnaire consists of four sections on the basis of contexts of soundscape. [12, 13] In the first section, it was asked to describe recognized sounds at each site. The second section sought to obtain the preference to physical conditions of urban Soundscape such as visual images, day-lighting, fragrances and odor and reverberance. All of the questions in second section were evaluated using 11-point numerical scale (with 0 as 'not at all' and 10 as 'extremely'). In the third section, the preferences of overall soundscape and acoustic comfort at each site were assessed. The last section dealt with demographic data (age, gender), frequency of visiting and noise sensitivity. Frequency of visit to urban spaces and noise sensitivity were also evaluated on the 11-point numerical scale.

Questionnaire for soundwalk in Seoul

Name :

1. What sounds can you hear?

	Recognized sounds
1. Department store	
2. Seoul square	
3. Jeong-dong road	
4. Gwanhwamun plaza	
5. Cheongye plaza	
6. Cheongyecheon	

2. What number from zero to ten best shows how much you prefer each item? (0: not at all and 10: extremely)

	0	1	2	3	4	5	6	7	8	9	10
1. Landscape											
2. Lighting											
3. Fragrances/odors											
4. Reverberation											

3. What number from zero to ten best shows how much you perceive the loudness? (0: not at all and 10: extremely)

	0	1	2	3	4	5	6	7	8	9	10

4. What number from zero to ten best shows how much you prefer the overall soundscape? (0: not at all and 10: extremely)

	0	1	2	3	4	5	6	7	8	9	10

Figure 18. Questionnaire for sound walk in Seoul

Position 6 with city stream obtained higher scores than other positions in every context, while position 1, department store, received the lowest rating. It can be seen that the positions with water features such as streams and fountains were rated relatively higher than the positions where buildings and streets were major artificial factors. Position 2, an open urban square in downtown, received the best rate in terms of day-lighting.

Correlation coefficients between overall impression and contexts are listed in Table 1. The results showed that fragrances and odor as well as acoustic comfort were highly correlated with overall impression of soundscape, while visual image, day-lighting and reverberance were not related.

Table 1. Correlation coefficients between overall impression and contexts (**p>0.01)

Visual image	Day-lighting	Fragrances and odor	Reverberance	Acoustic comfort
0.24	0.20	0.52**	0.15	0.36**

Comparison of the responses from domestic and foreign experts was made by the t-test. Results showed that the difference between the responses was significant in terms of fragrances and overall impression. The results imply that personal and cultural contexts could affect the perception of Soundscape. For instance, under the lacking condition of natural features in their city, the city dwellers prefer to have stream crossing the downtown area. The acoustic comfort was also perceived differently in accordance with cultural diversity including languages and familiarity with the locations. For further results see the paper by Joo Young "Evaluation of urban soundscape using sound walking" ICA Sydney 2010). [15]

Also, it should be mentioned that due to the very coldness and the ice cold wind the sound walk was shortened following the participants' proposal. Moreover, following the comments given by the participants the temperature was clearly having an input on the subjective judgement. On the other hand it had also an input on sound propagation and the characteristics of the sound.

Considering the psychoacoustic analyses of the different scenarios it must be mentioned that the investigated places differ significantly (fig. 5). For example, place 5 shows very high values regarding the psychoacoustic parameters loudness and sharpness. With respect to AI (Articulation Index) and SII (Speech Intelligibility Index) this place also displays values (low), which can be interpreted as poor noise quality. In contrast to it, place 2 shows low loudness and sharpness values as well as less noise patterns (Relative Approach). This refers to a probably good noise quality. The same can be applied for place 6.

Advanced acoustic parameters can be used to gain indications with respect to the noise quality of the considered area. The sound character can be determined and used for interpretation of the acoustical impression of the place. However, the consideration of the acoustic quantities alone is not sufficient, since different sounds and respective sources have a certain meaning for the people, which will influence the perception and evaluation of the soundscape.

CONCLUSIONS

The first joint workshop by Korean and German participants provided a lot of new data regarding the Soundscape evaluation, especially with respect to cultural points of view. Interestingly, some hypothesis could be verified through this joint evaluation process especially regarding local experts and further participants and their respective understanding of an area. The first results here clearly show the evidence of local expertise. Moreover, the realization of a soundscape investigation, where several researchers with different socio-cultural as well as disciplinary backgrounds were engaged, turned out to be very efficient, since several dimensions and facets were explored only identifiable by using different perspectives. Therefore, it appears imperative to make further efforts for interdisciplinary collaboration in soundscape projects in order to gain a deeper understanding of soundscape perception.

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